D.—OFFICIAL DUTIES, 1931-32.

Constitution of the Department.—The constitution of the Department remained the same as in last year, *viz*:—

Chief Inspector of Mines in Mysore	...	Mr. C. E. Suryanarayana Rau
Inspector of Mines (Acting)	...	„ K. Duraiswamier
Assistant Inspector of Mines (Acting)	...	„ V. Narayana Rau
Junior Inspector of Mines (Provisional)	...	„ J. P. David
Probationer	...	„ R. S. Batni

Office Inspection.

The annual inspection of the office was carried out in April 1932. Everything was found to be in order.

Statistics of Business.

During the year 2,496 letters were received and 2,353 despatched compared with 2,440 and 2,283 in the previous year.

Stores and Stock-Taking.

The Stock Registers relating to furniture and other articles are written up-to-date. These were checked as required by Codal Rules and found correct.

Inspection of Mines—Kolar Gold Field.

Owing to the increasing depths of these mines, two of which have reached a depth of over 7,100 ft. below field datum, inspection work is becoming more arduous and exacting. In addition to the numerous inspections connected with accidents, all the mines were systematically inspected and no serious lapses of the Mining Rules were noticed. In a few cases the defects brought to the notice of the Mine management were immediately set right and all suggestions carried out.

Enquiries into all fatal and serious accidents and trivial ones in which a breach of the rules was reported or suspected, have been held.

Examination of Candidates for Certificates Under the Mining Rules.

Under rules 15 and 16, Mysore Mining Rules, examination for the grant of certificates of mestris, blasters and engine drivers (1st and 2nd class) are conducted by the Department once a week. In all, 372 candidates were examined during the year.

The following statement shows the number of candidates examined and certificates granted up to the end of June 1932.

Year	Mestris		Blasters		Engine drivers			
					First Class		Second Class	
	Number examined	Number passed	Number examined	Number passed	Number examined	Number passed	Number examined	Number passed
Total up to June 1931.	13,886	13,618	9,450	8,862	421	421	203	203
For 1931-32 ...	220	220	141	106	2	2	9	9
Total up to end of June 1932.	14,106	13,838	9,591	8,968	423	423	212	212

On application and after verification, 81 duplicate tickets (discs) were issued to mestris and 1 to an engine driver (second class), the originals having been lost by the applicants.

The fees realised during the year from candidates appearing for the above examinations, duplicate discs and fees levied for testing the lightning conductors attached to explosives magazines, etc., amounted to Rs. 1,713-9-0 as against Rs. 2,583-9-0 in the previous year, the decrease being due to lesser number of candidates examined.

Inspection of Mining Accounts.

In accordance with the Standing Orders of Government, the annual inspection of the books and accounts of one of the Gold Mining Companies, *viz.*, Ooregum Gold Mining Company of India, Ltd., was conducted by the Comptroller to Government in association with the Chief Inspector of Mines. Everything was found in order.

As usual, the Resident Auditor, Messrs. John Taylor and Sons' Committee, placed the services of his Assistant at the disposal of the Comptroller and the inspection work was much facilitated by the help rendered by this officer and the Company's Accountant and our thanks are due to them in this behalf.

Inspection of Mines—Outside Kolar Gold Field.

The following blocks outside the Kolar Gold Field were inspected during the year:—

Kolar District.—			
Ganacharpur ...	Graphite	...	Government area
Doddur Karpanhalli ...	Kaolin		Prospecting License No. 732
Mysore District.—			
Shinduvalli ...	Chrome	...	Mining Lease No. 147
Talur ...	Do	...	Government area
Dodkanya ...	Chrome and Magnesite	...	Mining Lease No. 150
Tumkur District.—			
Sondenhalli (Solid Hill)	Manganese	...	Mining Lease No. 168
Dodguni and Shivasandra ...	Do	...	Do 169
Karekurchi ...	Do	...	Do 170
Beerasandra ...	Soapstone	...	Collecting License No. 110
Hassan District.—			
Sunkadhalli ...	Chrome	...	Mining Lease No. 172
Pensamudra ...	Do	...	Do 174
Shimoga District.—			
Shankargudda ...	Manganese	...	Mining Lease No. 141
Kumsi ...	Do	...	Do 142
Kumsi and Choradi ...	Do	...	Prospecting Licenses Nos. 729 and 723

The manganese blocks held by the Peninsular Minerals Co. of Mysore in the Tumkur District, *viz.*, Sondenahalli, Shivasandra and Karekurchi were surrendered to Government. Likewise the United Steel Cos., Ltd., surrendered all the mining and prospecting blocks held by them in the Shimoga District. The protective works carried out on these blocks were inspected and being found fairly satisfactory, release cirtificates were issued in respect of them in accordance with the Mining Rules.

The workings on most of the other blocks were generally satisfactory except in a few cases where necessary action was taken to remedy the defects noticed.

II. Labour Employed.

The total number of persons employed in the Mining Industry in 1931 was 19,109 as against 18,925 in the previous year showing an increase of 184.

Of this number, 18,388 were employed in gold mining against 17,312 in 1930, 92 on manganese against 330, 294 on chromium against 840, 145 on iron ore against 220, 130 on limestone against 130, 25 on magnesite against 66, 15 on kaolin against 12 and 20 on soapstone against 15.

Of the 18,388 persons employed in gold mining, 341 were Europeans, 400 Anglo-Indians and 17,647 Indians, a total of 9,954 being employed below ground and 8,434 on surface; of the latter, 1,089 were women and 446 children under 12 years of age.

The working hours underground and on surface remain the same as in the previous year. The average wages paid to different classes of European and Indian employees per month are embodied in Table 5 attached to this report.

The following statement gives the average number of hours worked and the average earnings per person per week for 1931 in respect of labour employed by the Gold Mining Companies and their Allied Departments on the Kolar Gold Field :—

Average number of hours worked per person per week		Average weekly earnings per person	
Underground	Surface	Skilled	Unskilled
		Rs. a. p.	Rs. a. p.
46	55	8 0 6	3 9 4

The supply of labour is adequate and all the amenities of life have been reasonably provided for. The relationship between the employer and employee is, on the whole, satisfactory.

Labour Enquiry.

The Report of the Special Officer appointed by Government to enquire into the labour conditions on the Kolar Gold Field has since been published and the various recommendations made by him in regard to the improvement in housing, service gratuity, creation of certain amenities of life and other points are engaging the attention of the Mine Management and many of the recommendations have already been given effect to.

Welfare Work.

All the five mines have had a welfare policy for their employees, but early last year it was decided to entrust all welfare work on the Field to a Central Committee, under the supervision of a European Welfare Officer. Each Mine has a Welfare Committee consisting of the Superintendent of the Mine with 8 others, both Indian and European workers, of whom 75 per cent are Indians with the Welfare Officer *ex-officio* member. These Mine Committees bring forward any suggestions or improvement they consider necessary in consultation with the workmen themselves. Any policy which may affect the welfare work of other mines is brought before the Central Committee with the idea of standardising expenditure and, if necessary, the sanctioning of financial aid. These Welfare Committees meet once a month.

Housing, improvement in living conditions, sanitation, facilities for bathing and washing, lighting, day and night schools, recreation halls, organisation of lectures on temperance, domestic economy, thrift, hygiene, etc., scouting, laying out parks and playgrounds, games, electric gramophones with amplifiers and maternity and child welfare are some of the subjects in which these Welfare Committees are interesting themselves. It is gratifying to note that commendable progress has been made under every one of the above mentioned items which the employees appreciate and feel thankful for. With the welfare work that is being done for the labourer to improve his living conditions and surroundings by providing amusement in his leisure hours close to his hut, it is hoped to wean him from the drink evil and money lender, if possible.

Miners' Phthisis.—The Committee of Medical Men appointed to study and report upon Pneumonokoniosis or Miners' Phthisis and other occupational diseases is still continuing its investigations and certain data collected so far has been sent to London for expert opinion, the receipt of which is awaited.

III. Accidents.

(*a*) Statistics for the year 1931.

The total number of accidents reported during the year 1931 was 200 against 186 in the previous year:—

Of these accidents:—

35	were fatal,
160	serious and
5	non-mining.
Total ... 200	

The total number of fatal and serious accidents was therefore 195 which works out at the rate of 10·20 per 1,000 persons employed.

The corresponding figure for the year 1930 was 184 giving a rate of 9·72 per 1,000 persons employed.

Enquiries were instituted into all the 195 accidents reported to this Department and 70 inspections were made in connection with accidents of more than ordinary importance.

Of the above 195 accidents:—

22 or 11·28 per cent were due to negligence,
10 or 5·13 per cent were due to recklessness and
163 or 83·59 per cent were classed as unavoidable.

The corresponding figures for the year 1930 were:—

14 or 7·61 per cent were due to negligence,
12 or 6·52 per cent were due to recklessness and
158 or 85·87 per cent were classed as unavoidable.

In the 35 fatal accidents, 131 persons were either killed or died from the result of injuries received, giving a mortality of 6·85 per 1,000 persons employed against a mortality of 2·12 per 1,000 persons employed during the year 1930.

The death rate in the Gold Mines which as usual employed the largest proportion of the labour was 7·12 per 1,000 against 2·31 per 1,000 in 1930. This abnormally high death rate was due to a disastrous fire accident in Nundydroog Mine involving a loss of 53 lives.

Of the 35 fatal accidents in 1931:—

29 or 82·86 per cent were unavoidable,
2 or 5·71 per cent were due to recklessness and
4 or 11·43 per cent were due to negligence.

There were 12 individual accidents involving two or more fatalities, 5 of these occurring in Mysore Mine, one in Champion Reef Mine, 4 in Ooregum Mine and 2 in Nundydroog Mine.

In these 12 cases 108 persons lost their lives compared with 6 and 16 respectively in 1930, 4 most serious of them accounting for 88 fatalities.

In the 15 separate accidents due to rockbursts, 59 persons were killed compared with 10 and 18, respectively, in the previous year. Of the above, 6 took place at Mysore Mine, one at Champion Reef, 6 at Ooregum and 2 at Nundydroog.

Only one fatal accident due to explosives occurred underground involving the death of one person against three and five, respectively in the previous year. It was due to a breach of rules Nos. 126 and 127 of the Mysore Mining Rules.

Falling away in shafts, winzes and stopes from various causes accounted for 12 fatalities in 12 separate accidents as against 5 and 5, respectively, in the previous year.

Classification of Accidents in 1931.

		Fatal accidents	Non-fatal accidents	Deaths	Serious injuries
1.	Rockbursts	15	35	59	57
2.	Falls of ground	...	3	...	3
3.	Falling in shafts, stopes, etc.	11	6	11	6
4.	Explosives (misfires, etc.)	1	8	1	12
5.	Trucks and Tramways	1	15	1	15
6.	Run over or struck by skips or cages, etc. ...	...	1	...	1
7.	Hoisting	2	6	2	10
8.	Other machinery	1	3	1	3
9.	Falls of rock and materials in shafts, stopes, etc.	2	28	2	28
10.	Ropes and chains breaking	...	...	...	...
11.	Fire hazard	1	...	53	6
12,	Other causes	1	55	1	55
	Total ...	35	160	131	196

Non-casualty accidents reported under Rule 165 of the Mysore Mining Rules.

There were 14 accidents reported under this head, caused as follows:—

(1) Engine running out of control	0
(2) Fracture of essential part of winding engine, crank shaft, couplings, bearings, gearings, clutch drum or drum shafts	0
(3) Fracture of winding rope or its attachments to skip, cage or drum ...	0
(4) Fracture of pit-head sheave or axle	0
(5) Failure of efficiency of brake	0
(6) Fracture of safety catch to act when required	0
(7) Failure of device for prevention of overwinding or of detaching hook to act when required	0
(8) Overwinding of cage or skip	14
(9) Bursting of anything containing steam, compressed air or other substance at high pressure	0
Total ...	14

Out of a total of 14 overwinds which occurred during the year, 11 were in connection with electric hoists and 3 in air hoists. All these overwinds were due to carelessness on the part of the drivers, one of whom was dismissed, one reduced from 1st class to 2nd class, one suspended for four months, eight were fined—ranging from Rs. 2 to 15—and 3, being first offenders, were cautioned.

(b) Compensation for Fatal and Serious Accidents in Mines on the Kolar Gold Field for the year 1931-32.

During the year 143 claims for compensation comprising 80 fatal, 2 permanent total disablement and 61 permanent partial disablement arose as a result of accidents in the Mines on the Kolar Gold Field and the compensation awarded under all the above heads amounted to Rs. 1,17,984-8-0 as against Rs. 88,441-15-0 disbursed in the previous year. This represents the amounts actually paid during the year excluding those pending settlement at the close of the year. Besides the above, compensation amounting to Rs. 13,360-1-0 was paid in cases of temporary disablement in pursuance of section 4(d) of the Workmen's Compensation Regulation as compared with Rs. 17,411-15-0 paid in the previous year.

An extract from the report of the Commissioner on the administration of the Workmen's Compensation Regulation on the Kolar Gold Field during 1931-32 is published in Appendix I of this report.

The following statement shows the number of fatalities, cases of permanent and temporary disablement and compensation paid therefor by the Mining Companies on the Kolar Gold Field during the year 1931-32 :—

Mine	Number of				Compensation paid				
	Fatalities	Cases of Permanent Total Disablement	Cases of Permanent Partial Disablement	Cases of Temporary Disablement *	Fatalities	Permanent Total Disablement	Permanent Partial Disablement	Temporary Disablement	Total
					Rs. a.	Rs. a.	Rs. a.	Rs. a.	Rs. a.
Mysore ...	22	...	18	504	15,554 6	...	6,483 9	3,606 14	25,644 13
Champion Reef ...	13	...	10	319	6,942 8	637 7	5,920 9	2,350 6	15,256 14
Ooregum ...	25	1	18	399	15,652 8	840 0	7,169 7	4,221 15	27,883 14
Nundydroog ...	5	...	11	378	41,687 8	1,253 0	5,796 2	2,135 8	50,872 2
Balaghat ...	†15	1	4	126	6,930 0	1,680 0	2,087 8	947 15	11,595 7
Allied Departments.	...	...	...	10	...	...	...	97 7	97 7
Total ...	80	2	61	1,736	86,766 14	4,410 7	26,807 8	13,360 1	131,344 9

* Only such disablement as lasts for more than ten days is shown in the above.

† Includes one non-mining case.

Amounts actually paid during the year have been shown in the statement excluding those pending settlement.

(c) Notes on accidents during the official year 1931-32.

There were 13 accidents involving the loss of two or more lives during this period resulting in a total of 46 fatalities against 6 such accidents and 90 deaths during the previous year. Of these, 10 were due to rockbursts causing 38 deaths, two of them alone being responsible for the loss of 18 lives, and the other eight deaths were due to two cage accidents and the collapse of a pigstye.

Cause	No. of accidents	No. of fatalities
Unavoidable	10	38
Negligence	2	6
Recklessness	1	2
Total ...	13	46

ROCKBURSTS.

There were in all 19 accidents from this cause including those mentioned above involving 47 fatalities; single deaths occurred in nine accidents and in the remainder, two or more fatalities occurred. Rockbursts were responsible for 60 per cent of the total deaths during the year in spite of the precautions taken to minimise their effects.

Accident No. 31 of 1932.—The worst accident of the year involving the loss of 11 lives occurred in the sink of No. 1 Deep Level Main Winze, Balaghat Mine, on the 20th February 1932. At the time of the accident a gang of muckers were engaged in hoisting broken rock from the sink which was 136 feet below the 53rd level. After 31 buckets of stuff had been raised, a very heavy rockburst occurred in the sink and buried all the persons present in it at the time. Four were immediately rescued alive while the rest could not be seen as they were completely entombed. By continuous rescue work the bodies of nine persons were recovered on the following day and in the interval two of the injured men sent to hospital died making a total of 11 deaths.

The Deep Level Main Winze, an ellipsoid in plan and concrete lined 15′, 2″ × 12′, 4″ in the clear, is divided into two cage roads, a ladder compartment and a sinking bucket road. It is in commission from the 44th level and had been lined with concrete to within 13 ft. of the sink. The north-east corner of the shaft lining had been blown out for an area of 6′ × 6′ and above this the concrete had been shattered and cracked to a height of 7 ft. The unprotected ground between the sink and the concrete had been dislodged all round for a thickness of 2 ft. to

3½ ft. One peculiar feature of this burst was that the bottom of the sink was blown upwards and some of the jumpers which were on the floor of the sink before the accident were later found on top of the debris.

This shaft was sunk without any mishap for about 1,000 ft.; the usual practice being to sink 20 ft. at a time and then put in the permanent concrete lining right down to the sink before continuing further sinking. But, while passing below the 53rd level, the ground showed signs of "spitting off" occasionally and to counteract it the strength of the concrete was increased by improving the mixture, the shape of the shaft was also altered to a perfect ellipse by rounding off the corners of the old shape, the thickness of the concrete was also increased from 1′ 8″ to 2′ 6″ and the sinking depth was reduced to 15 ft. at a time. In spite of these precautions this violent burst occurred with disastrous consequences. This rockburst was both heard and felt on surface at the time. It is believed that a water course met with in the 53rd level and expected to be cut in the shaft is in some way responsible for this burst.

Accident No. 107 of 1931.—This accident was due to a pillar burst which resulted in the death of seven handjumper coolies who were at work on a stope face below the 68th level S., Bullen's Incline Shaft, Ooregum Mine. The working face was 36 feet long with an average width of 4 feet and was 50 feet below the level. The excavation was supported with cribs to within 10 feet of the working face and coverings had been fixed to protect workmen against objects falling from above. The hanging wall in the chute end was blown out for a length of 15 feet below the line of cribs, the rest of the stope was unaffected. About 25 tons of rock was dislodged and as all the men were concentrated at the point of the stope at the time, they were all killed. The excavations above and below this pillar of ground had been systematically supported with granite packs and crib sets. The remaining portion of the pillar will be stoped by machine in preference to hand labour so as to reduce the number of men at work.

Accident No. 102 of 1931.—About 9-45 A.M. on the 22nd July 1931, a series of very heavy rockbursts occurred in Mysore Mine affecting a very large area of ground from the 32nd to the 45th level in the neighbourhood of Edgar's Shaft—the main artery of the mine. It is circular in shape, bricklined and vertical. The bricklining of the shaft had been knocked out in many places for a distance of 700 feet from the 32nd to the 39th level. The byatts fixed from north to south were unaffected and the east and west sides of the shaft alone suffered. Many levels in the vicinity of the shaft were blocked and at the 32nd level where three men were killed the back of the level was dislodged to a height of 10 feet bringing down the timbering with it. Heavy fall of ground at this particular place was due to the proximity of a large fault. At the 37th level a ventilation door was so squeezed that it could not be opened. All the damaged levels are being reclaimed by fixing tunnel sets.

This was a case of the failure of the shaft pillar which had been left intact for a considerable distance all round the shaft to a depth of over 700 feet. The stoped-out area had been adequately supported with waste rock packs. At the time of the collapse of this pillar, a very heavy burst occurred in the first instance followed by a number of smaller bursts, which continued to occur throughout the day till the equilibrium was restored.

Accident No. 164 of 1931.—This accident occurred in a sinking shaft. Edgar's Sub-Vertical Shaft—circular, bricklined, 18 feet in diameter—is being sunk from three different horizons 51st, 55th and 65th levels to expedite sinking operations. It is usually sunk for 50 feet at a time and then a three foot concrete ring is fixed and brick lining is continued upwards. On the morning of the 2nd November 1931, a number of coolies lowered in the bowk to the 76th level, were in the act of getting out of it when a very heavy rockburst occurred about 350 feet below the 65th level dislodging bricks and parts of the concrete ring. All the men in the bowk were injured and two were killed instantaneously and one died later in hospital. At the place where the burst occurred, the shaft had passed through a few stringers of quartz in the country rock and a thicker lining of bricks had been put in here as a precautionary measure and this saved more damage being caused by this burst. This shaft had been sunk without any mishap for a distance of 1,022 feet.

Accident No. 184 of 1931.—A mestri and three coolies were loading a skip with granite blocks at the 48th level plat, Auxiliary Main Winze, Mysore Mine, on the 4th December 1931, when a very heavy rockburst occurred in the shaft itself and buried all these men. This shaft had been sunk on the reef in the northernmost ore shoot of the mine between the 45th and the 51st levels and 70 feet of the shaft was smashed up and filled with debris and the 48th level South of the shaft was blocked for 100 feet. The rescue work had to be carried on from underneath the block under trying conditions. The mestri, who was found with his right leg caught between a shaft timber and a large slab of rock with his right leg hanging down the shaft and his body in the skip, was rescued alive after the lapse of 20 hours but the others perished. One of them was recovered on the following day while it took 20 days to get the last two bodies out. All stoping work in this area was stopped after this accident and work is now concentrated in repairing the damage done.

Accident No. 33 of 1932.—As a result of the continuous rill-stoping of a block of ore, 150 ′ x 90 ′, between the 64th and the 65th levels S., Carmichael's Secondary Shoot, Champion Reef Mine, a roughly triangular remnant, 50 feet in length, was left. A length of 25 feet of this pillar was taken out from the south end to a depth of 8 feet and filled in with mass concrete to secure the level and the excavation below the pillar had been filled with waste rock and sand. Arrangements were made to work this remnant as a bottom stope and a machine mestri and his cooly were working at the south end of the pillar when a very heavy rockburst occurred and blocked the level on both sides of the pillar entombing the two persons whose bodies were recovered eight days later.

One remarkable feature of this accident was that the burst was felt like a quake and it was followed by intermittent bursts of lesser intensity which continued for 45 minutes. The first of them was the heaviest and the Seismographs at the Observatory recorded the following movements of styles:—

North-South 9·7 m/m. East-West 10·4 m/m. Vertical 3·7 m/m.

All the other accidents due to rockbursts are of ordinary nature and do not call for any special remarks.

Hoisting.

Two fatal accidents occurred while persons were being raised and lowered in cages resulting in the death of three persons in each case. One was due to the derailment of the cage in an inclined shaft and the other was caused by bumping the cage violently against the keps in a vertical shaft.

Accident No. 18 of 1932.—On the morning of the 1st February 1932, while a three decked cage containing nine persons in each deck was being lowered from the 42nd to the 73rd level in Bullen's Incline Shaft, Ooregum Mine, it struck an obstruction—a jumper (steel)—and derailed. It bumped violently against the shaft timbers, damaged the cage doors and caused them to open of themselves. Of the 27 persons in the cage, two were killed instantaneously while a third person died later in hospital. The enquiry held into this case showed that the accident was due to the practice of handling loose steel jumpers in the shaft, which has since been discontinued and a safer method adopted.

Accident No. 49 of 1932.—Heathcote Shaft, Champion Reef Mine, oval and lined in concrete, is equipped with double decked cages with a carrying capacity of 30 persons in each deck. They are provided with doors with latches outside. The bottom deck is designed to carry two ore trucks and at all loading stations keps operated by a hand lever are fixed in the shaft. On the morning of the 17th March, raising and lowering of persons was in progress between the 40th and the 74th level. About 8 A.M. while the south cage containing persons was being lowered from the 40th level to the 74th level, the ascending North cage was stopped at the 70th level for sending up a jumper truck. The selfacting type of 'keps' actuated by counterbalancing weights were drawn into the roads as usual for the cage to sit on to facilitate loading of the jumper truck. Immediately after the cage is raised the keps should fly back to clear the roads, but on this occasion they did so only partially with the result that the descending south cage bumped violently against them, in consequence of which three persons were thrown out of the cage into the shaft and killed.

To prevent similar accidents occurring in future, the " kep gear " is connected electrically with coloured lights in front of the driver's platform to indicate their position and warn him against obstructions in the cage roads.

Explosives.

There were four fatal accidents involving four fatalities due to drilling into or intersecting sockets. Three of them occurred in the Kolar Gold Field, while the fourth happened in Shinduvalli Mine, Mysore District. The certificates of mestris responsible for three of these accidents were suspended, while the person responsible for the accident in the Shinduvalli Mine was prosecuted. This case is pending with the Magistrate.

Falling in Shafts, Winzes, Stopes, Etc.

There were 13 accidents involving fourteen deaths during the year as against seven accidents and seven deaths, respectively, during the previous year. Of these, seven were due to unavoidable causes and the remaining six to recklessness or negligence of the deceased themselves. The details of these accidents are:—

In one case, a cooly attempting to cross over the roads in a vertical shaft slipped and fell 75ft. Two coolies fell down while climbing ladders in a stope and a shaft, respectively. A block of granite stone rolled down an incline shaft and struck a person on the head; a person working in the skip roads was knocked down the shaft by a descending skip.

While working close to the chute ends in stopes, three coolies fell down the chute passes and were killed. While riding up in a cage two persons were thrown out of the cage and one of them fell down the shaft. While getting out of the bucket in a sinking shaft one man lost his hold and fell into the sink; in another case a cooly, while opening a door covering a bucket road, slipped and fell down the winze. A shaft man working on a stage in a vertical shaft overbalanced and fell into the shaft. While stripping a winze of its timber work, the sets suddenly collapsed and a cooly who had neglected to wear the life-belt fell down and lost his life. A handjumper cooly presumably walked in the dark into an open winze and fell 100 ft., death being instantaneous.

Cases of Neglected Injuries.

During the year, 15 cases of neglected injuries were reported to this Department. Of these one proved fatal as septicæmia supervened as a result of septic arthritis following wound of left knee. This workman did not attend hospital until six days after the accident and succumbed nine days after admission. In the majority of cases treated, the period of neglect varied from one day to fifteen days. In spite of the best medical aid available in the Companies' hospital, cases of neglected injuries continue to occur as no hospital pay is allowed for an injured person for the first ten days of his stay in hospital in accordance with the provisions of the Workmen's Compensation Regulation. Owing to this circumstance the labourer prefers to be at work, though injured, instead of losing his wage by attending hospital. The question of reducing the waiting period from ten days to seven days is engaging the attention of the authorities concerned.

IV. Meteorology and Seismology on the Kolar Gold Field.

The following has been taken from the report for the year 1931 by Mr. H. A. Martin, Meteorologist, kindly furnished to this Department by Messrs. John Taylor & Sons' Committee, Oorgaum.

Meteorology.

Observations were taken daily at 8, 10 and 16 hours and tabulated.

Temperatures.—The highest dry and wet bulb temperatures recorded during the year were 103·8°F and 75·3°F, respectively, while the lowest were 54·5°F and 52·0°F, respectively. Their mean values were 0·8°F and 0·9°F, respectively above normal.

The reading of 103·8°F obtained on 21st May constitutes a record high shade temperature for the Kolar Gold Field.

Rainfall.—The rainfall for the year was low, the total registration being 24·59 inches as against a normal of 31·07 inches over a 23 year period. The greatest amount recorded in 24 hours was 1·80 inches on the 30th May.

Seismometry.

Throughout the year, the seismographs have been kept in good working order and instrumental failures have been few as compared with the previous year.

Classification of Rockbursts.—No alteration has been made in the system of classification so that the figures can be readily compared with those issued for previous years.

The total number of bursts recorded during the year was 3,580 as against 2,322 in 1930.

Displacement in Millimetres	Number of Rockbursts 1931	Normal (mean)	Departure
Less than 1·0	2,905	1,837	+1,068
Between 1·0— 2·0	418	193	+225
Between 2·0— 3·0	116	44	+72
Between 3·0—10·0	111	41	+70
Between 10·0—20·0	9	9	0
Over 20·0	11	10	+1
Those in which one or more styles were thrown off	10	5	+5
Total ...	3,580	2,139	1,441

The following table shows the total number of bursts of 1 m/m. displacement and upwards during the years of observation :—

Year	Total	Year	Total
1912	127	1922	303
1913	192	1923	282
1914	200	1924	328
1915	238	1925	445
1916	229	1926	337
1917	90	1927	341
1918	106	1928	295
1919	132	1929	446
1920	253	1930	693
1921	322	1931	675

Average for 1912—1931=302.
Excess over average in 1931=373.

It may be said that for the past twelve months "slight" bursting shows a marked increase whilst in the "Medium" to "Heavy" classes there has likewise been a pronounced excess over normal.

Earthquakes and Tremors.—The following table shows the number of shocks recorded during 1931 together with the normal and departure therefrom :—

	1931	Normal	Departure
Earthquakes ..	42	29	+13
Tremors ...	397	255	+142

Ground Tilting at the Observatory.—Wanderings of the zero settings of the instruments have been continually measured and recorded.

During 1930, the ground over the hangingwall of the workings acquired a pronounced tilt in a direction almost due west and throughout 1931, this tilt has steadily increased implying a slow but continual sag westward over the hangingwall of the workings.

V. Underground Air Temperatures.

The deepest workings on the Kolar Gold Field over 7,000 feet vertically below Field datum are in Champion Reef and Ooregum Mines and the rock temperature

at this depth, recorded in a hole six feet deep specially made for the purpose, is 124·2°F. It will be seen from the following statements that the air temperature in some of the deep level workings and at other places also is generally very dry compared with that obtaining underground on the Rand Mines. This is due to the dry and wet methods of mining practised at the two places respectively. The rockdust produced in Kolar Gold Field Mines being generally less innocuous owing to the low percentage of free silica present in it, the necessity to practise complete wet mining has not arisen here. On the other hand, owing to the prevalence of high rock temperature underground, cases of "Heat exhaustion"—quite different from "Heat stroke" cases met with in Rand Mines due to increased humidity—occur amongst the workmen. Some of them occasionally get exhausted and faint underground but they soon recover on removal to a well ventilated place or after a short stay in hospital under proper medical supervision. Fatalities from this cause are very rare.

There were 22 cases from this cause during the year as against 16 cases in the year previous; seventeen of them were due to excessive heat at the working place, one to general debility, two to non-acclimatisation and two to other causes. All of them were trivial.

UNDERGROUND AIR TEMPERATURES—1931.

Field Datum, 2,967 feet above sea level (Madras).

Downcast							Upcast						
Names of Shafts and Stations	Vertical depth below Field Datum (feet)	Dry Bulb F°	Wet Bulb F°	Difference	Relative humidity per cent	Grains of water vapour per lb. of dry air	Names of Shafts and Stations	Vertical depth below Field Datum (feet)	Dry Bulb F°	Wet Bulb F°	Difference	Relative humidity per cent	Grains of water vapour per lb. of dry air
MYSORE GOLD MINING COMPANY, LIMITED.							MYSORE GOLD MINING COMPANY, LIMITED.						
Edgar's Shaft collar	18	70·9	66·1	4·8	76·8	97·7	Rowse's Auxiliary Shaft, 44th plat ...	2,963	92·7	86·5	6·2	76·6	180·3
Do 39th level plat	2,588	83·0	73·3	9·7	64·0	107·8	Rowse's No. 2 Auxiliary Shaft 57th plat ...	4,303	103·3	87·3	16·0	51·0	159·0
Do 51st do	3,709	88·5	77·0	11·5	58·0	115·5	Do do 76th plat ...	6,183	112·6	91·2	21·4	44·0	162·2
Air Shaft, 55th plat	4,103	90·7	81·5	9·2	65·0	139·6	Ribblesdale's No. 2 Auxiliary 76th plat ...	6,185	108·7	90·5	18·2	48·5	163·4
Do 76th plat.	6,183	108·0	89·2	18·8	45·4	154·4							
Edgar's Auxiliary 76th plat	6,183	107·1	89·9	17·2	48·6	161·8							
CHAMPION REEF GOLD MINES OF INDIA, LIMITED.							CHAMPION REEF GOLD MINES OF INDIA, LIMITED.						
Gifford Shaft collar	24	72·9	66·2	6·7	69·2	94·4	Glen's 40th level plat	3,670	90·3	83·3	7·0	74·0	155·9
Do 40th level crosscut ...	3,670	90·0	74·8	15·2	47·6	100·4	63rd level Ventilation Winze North ...	5,902	107·3	87·5	19·8	42·5	143·7
Carmichael's 40th level plat	5,670	90·3	76·6	13·7	52·6	110·0	Garland's Shaft 40th level Fan Chamber ...	3,670	95·0	84·8	10·2	64·6	158·8
Heathcote Shaft 70th level plat	6,580	106·3	83·0	23·3	35·4	109·9	Glen's Main Winze, 70th plat	6,580	106·4	84·2	22·2	38·6	118·2
Do 74th do	6,980	107·0	90·0	17·0	50·0	158·0	59th level N. upcast	5,513	104·5	86·9	17·6	46·8	145·7
OOREGAUM GOLD MINING COMPANY OF INDIA, LIMITED.							OOREGAUM GOLD MINING COMPANY OF INDIA, LIMITED.						
Bullen's Shaft collar	108	76·3	69·7	6·6	71·0	109·9	Circular Shaft collar	98	81·2	76·7	4·5	81·0	145·5
Bullen's Incline 42nd level plat	3,811	94·4	80·6	13·8	53·8	129·9	Auxiliary Shaft 62nd level	5,726	101·8	87·7	14·1	53·8	157·4
Do 70th level crosscut ...	6,427	106·2	88·4	17·8	47·4	150·6	Do 70th level	6,428	111·1	92·3	18·8	47·0	173·7
Do 73rd do ...	6,727	105·6	89·0	16·6	49·8	154·8	Do 60th level	5,526	107·6	86·5	21·1	40·5	138·9
NUNDYDROOG MINES, LIMITED.							Circular Shaft 32nd level Heading ...	2,880	92·2	81·4	10·8	61·1	144·4
							NUNDYDROOG MINES, LIMITED.						
Henry Shaft collar	111	73·1	65·6	7·5	66·0	90·8	Taylor's Section, 51st level	4,487	100·7	85·1	15·6	50·8	146·6
Do 48th level plat	4,199	94·4	77·1	16·3	45·4	105·9	Do 50th level	4,368	102·3	85·1	17·2	47·6	144·5
Number 2 Auxiliary, 51st level crosscut ...	4,487	93·4	81·3	14·1	54·0	129·8	Do 51st level west crosscut ...	4,487	99·4	84·6	14·8	52·4	145·9
Number 1 do drive N. end...	4,489	100·1	83·1	17·0	48·0	133·2	Richards' Incline 2,000' plat ...	1,750	81·4	78·5	2·9	87·4	147·9
							Richards' Vertical Shaft 2000' plat ...	1,750	86·8	81·5	5·3	78·8	160·6

COMPARATIVE STATEMENT OF TEMPERATURE AND RELATIVE HUMIDITY OF ATMOSPHERE IN DEEP LEVELS AND SOME OF THE WORKING PLACES THEREIN.

Field Datum is 2967·21 feet above sea level (Madras).

Locality						Development points and Stopes					
Horizon	Vertical depth below Field Datum (feet)	Dry Bulb F°	Wet Bulb F°	Difference	Relative Humidity per cent	Place of work	Dry Bulb F°	Wet Bulb F°	Difference	Relative Humidity per cent	Remarks
OOREGAUM GOLD MINING COMPANY OF INDIA, LIMITED.						OOREGAUM GOLD MINING COMPANY OF INDIA, LIMITED.					
56th level N. Bullen's Shaft	5,153	101·0	82·0	19·0	43·0	Stope above 56th level N. Bullen's Incline ...	105·0	88·0	17·0	49·0	30 feet above level.
64th level N. Do	5,897	110·0	87·0	23·0	38·0	No. 22 stope above 64th level N. do ..	111·0	87·0	24·0	37·0	15 Do
67th level N. Do	6,178	111·0	87·0	24·0	37·0	No. 8 stope above 67th level N do ...	108·0	89·0	19·0	45·0	20 Do
67th level S. Do	6,178	107·0	86·0	21·0	40·0	No. 38 stope below 67th level S. do ...	109·0	89·0	20·0	44·0	10 feet below level.
68th level N. Do	6,278	109·5	87·0	22·5	39·0	Stope below 68th level N. do ...	107·0	91·0	16·0	56·0	30 Do
70th level N. Do	6,427	109·0	87·0	22.0	40·0	Stope below 70th level N. do ...	109·0	8·80	21·0	41·0	15 Do
73rd level S. Do	6,703	107·0	88·0	19·0	45·0	Drive 76th level N. down No. 2 Winze ...	108·0	9·60	12·0	63·0	40 feet N. of No. 2 Winze S. Bullen's Incline.
73rd level N. Auxiliary Shaft	6,727	109·0	89·0	20·0	44·0	Drive 76th level S. down No. 5 Auxiliary Winze.	109·0	93·0	16·0	54·0	20 feet S. of No. 5 Winze.
62nd level N. Oakley's No. 2 Vertical ...	5,726	104·0	91·0	15·0	59·0	No. 16 stope below 62 N. Oakley's No. 2 Vertical.	104·0	95·0	9·0	71·0	50 feet below level.
70th level N. Auxiliary Shaft	6,427	106·0	89·0	17·0	50·0	Stope above 70th level N. Auxiliary Shaft ...	108·0	95·0	13·0	60·0	25 feet above level.
CHAMPION REEF GOLD MINES OF INDIA, LIMITED.						CHAMPION REEF GOLD MINES OF INDIA, LIMITED.					
45th level S. Glen's Shaft	4,132	92·0	91·0	1·0	96·0	Stope above 45th level S. Glen's Shaft ...	93·0	91·0	2·0	92·0	35 Do
59th level N. Carmichael's Shaft	5,518	104·0	87·5	16·5	50·0	Rill stope above 60th level N., Carmichael's Shaft.	103·0	88·0	15·0	53·0	
67th level S. Do	6,276	103·0	88·0	15·0	53·0	Rill stope above 67th S. do do ...	106·0	90·0	16·0	52·0	
69th level N. Do	6,476	104·0	90·0	14·0	56·0	Do above 69th N. do do ...	105·0	90·0	15·0	54·0	
70th level N. Do	6,580	105·0	89·5	15·5	53·0	Do above 70th N. do do ...	106·0	92·0	14·0	57·0	
70th level S. Heathcote Shaft (End of drive)...	6,580	106·0	95·0	11·0	65·0						
71st level S. North Development Winze ...	6,680	105·0	89·0	16·0	51·0	Rill stope above 71st S. North Development Winze.	105·0	91·0	14·0	57·0	
71st level S. South Do do ...	6,680	109·0	93·0	16·0	54·0	Sink of No. 4 Winze below 71st S. South Development Winze.	101·0	91·0	13·0	59·0	74 feet below 71st.
74th level S. Do do ...	6,980	107·0	89·0	18·0	47·0	74th level S. South Development Winze—dead end.	115·0	94·0	21·0	47·0	Drive being advanced.
74th level N. Do do ...	6,980	110·0	91·0	19·0	47·0	75th level N. drive down No. 2 Winze ...	112·0	93·0	19·0	47·0	

N.B.—The annual mean values of dry and wet bulb temperature on surface were 76·8°.F and 665°F respectively which represents an excess of 1·2°F and 0·9°·F over the corresponding figures for the previous year.

VI. Prosecutions.

(a) In connection with thefts, etc., of Mining Materials.

The following statement shows the number of cases dealt with during the year 1931 by the Special First Class Magistrate, Kolar Gold Field, in connection with the theft and illegal possession of mining materials under section 6 of the Mysore Mines Regulation as compared with 1930:—

Year	Number of cases	Number of persons put up	Number of persons convicted	Value of property recovered
				Rs. a. p.
1931	37	44	40	1,518 8 0
1930	50	55	45	2,190 15 0

The following table shows the various kinds of mining materials in respect of which prosecutions were instituted during the year 1931:—

Kind of material	Number of offences dealt with	Number of persons charged	Number of convictions	Value of property recovered
				Rs. a. p.
Gold quartz	8	9	8	326 4 0
Auriferous tailings	5	5	5	17 3 0
Amalgam	4	8	6	7 12 0
Sponge gold	18	19	18	1,154 13 0
Explosives	2	3	3	12 8 0
Tools	...	...	...	.....
Candles	...	...	...	.....
Total ...	37	44	40	1,518 8 0

(b) In connection with breach of Rules, Accidents, etc.

The following is a comparative statement for the years 1931, 1930 and 1929:—

	1931	1930	1929
Number of cases	15	24	27
Number of persons put up	27	43	28
Number of persons convicted	23	41	28
Number of persons acquitted	1	...	...
Number of persons discharged	3	1	...
Number of persons not found	...	1	...
Number of cases pending	...	...	...

Of the above 15 cases, three were put up under the Indian Penal Code and 12 under the Mysore Mines Regulation. The penalties in the case of convictions ranged from fines of Rs. 2 to Rs. 25 and imprisonment from one day to two months.

During the year, four persons were prosecuted for breaches of the Mines Regulation and Rules framed thereunder resulting in accidents and all of them were convicted.

Less serious offences committed in connection with 28 accidents entailed departmental punishment of 29 persons who were either fined or had their certificates suspended or cancelled.

Similarly, ten other persons were dealt with departmentally for offences not resulting in accidents.